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(SSD not included)

SeriTek™/i6G

**Bootable, Two Port Internal Serial ATA 6G,
PCI-Express 2.0 Host Adapter**

Macintosh User Manual

FirmTek, LLC
www.firmtek.com

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Changes

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Before installing the SeriTek/i6G or any other hardware or software, you are responsible for backing up data contained on any storage devices. After hardware or software installation, you are responsible for backing up data on any storage devices at frequent intervals. FirmTek, LLC is not liable for any loss of data or damage to equipment resulting from the use of the SeriTek/i6G host adapter.

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I. Introduction

Welcome

Congratulations and thank you for purchasing the SeriTek/i6G Serial ATA host adapter. This product is another innovative solution made possible by the creative engineers at FirmTek.

About This Manual

This user manual was written with the assumption you are familiar with the Macintosh computer, and are comfortable with opening its case. For further information, and to get acquainted with your computer, please refer to your Macintosh user manual.

About Serial ATA Technology

An evolutionary replacement for Parallel ATA, Serial ATA (Advanced Technology Architecture) provides an interface that allows computer users to connect additional hard disks and peripherals. Serial ATA offers insulated cables that are thinner and longer with smaller 7-pin connectors which results in easier installation and improved airflow, compared to wider and shorter Parallel ATA cables. Improved airflow translates into a cooler operating environment for the Macintosh and hard disks.

About the SeriTek/i6G Serial ATA Host Adapter

The SeriTek/i6G host adapter extends Serial ATA's 6.0 Gbit/sec performance to SSD and 2.5" HDD without the need for an external enclosure. Drives are mounted directly on the SeriTek/i6G, enabling users with PCI-Express compatible Macintosh computers to take advantage of the latest hi-speed SSD storage internally or install the card in an external Thunderbolt chassis for use with a Thunderbolt compatible computer.

With two internal 6G Serial ATA ports built right on the card and PCI-Express connectivity, the SeriTek/i6G host adapter provides the high bandwidth necessary to meet the needs of performance-hungry applications.

Package Contents

- SeriTek/i6G Serial ATA host adaptor
- Six 2.5" SSD/HDD mounting screws
- CD-ROM Containing Macintosh User Manual

Key Features and Benefits

- Two high performance 2.5" internal SATA mounting connections on the PCIe card
- Bootable with Mac OS X 10.6.x thru 10.10.x.
- Thunderbolt aware for use with Thunderbolt PCIe Expansion Chassis or in a PCIe slot
- Boosts overall performance, per-port data transfer burst rates up to 600 MBytes/sec or 6Gbits/sec
- Compatible with Apple Mac Pro and Windows 7/8 PCI-Express 4x equipped computers
- PCI-Express Base 2.0 specification compliant and SATA 6Gb/s Compliant
- Supports PCIe communication speeds of 5.0Gbps and 2.5Gbps
- Includes 32 and 64-bit support for Intel-based Mac Pro models
- Native SATA 6G SSD and HDD support: Backward compatible with 3G and 1.5 Gbps devices
- Supports Apple Disk Utility RAID and JBOD drive configurations
- Complete CRC error checking for all bits transmitted, offers enhanced data protection
- Bus Mastering off-loads data I/O handling from CPU
- Supports Native Command Queing (NCQ)
- User-upgradeable firmware
- Perfect for upgrading and expanding Macintosh computers by leveraging the power of PCI-Express Host interface with internal SSD 6G SATA connectivity
- Bus master operation enhances multitasking during disk transfers and increases CPU efficiency: The CPU is free to handle other tasks during data transfers between the PCI-Express Bus and system
- Ideal for multimedia-intensive applications: audio/video capture and editing, and graphics manipulation/publishing
- Ideal for a variety of applications: Desktop publishing, Audio/Video storage and editing, photo storage and editing, servers, and gaming

Specifications

Hardware Requirements	<ul style="list-style-type: none"> PCI-Express based Macintosh or PC with available PCI-Express 4x expansion slot Supports Thunderbolt PCIe Expansion Chassis
Operating Systems Supported	<ul style="list-style-type: none"> Mac OS X version 10.6.x or later Windows 7/8 32 or 64-bit
Bus Type	<ul style="list-style-type: none"> PCI-Express 2x - Compatible with 4x, 8x, 16x slots
External & Internal Connectors	<ul style="list-style-type: none"> Serial ATA 6G interface supports up to two 2.5" drives mounted on the PCIe card
Drive Types Supported	<ul style="list-style-type: none"> SATA 6G SSD and HDD devices, backward compatible with SATA 3G, 1.5G drives. Internal PCIe mounting supports 2.5" HDD or SSD
Data Transfer Rates	<ul style="list-style-type: none"> Up to 600 MBytes/second or 6.0 Gbits/second burst data transfer rate per channel
Drive Modes Supported	<ul style="list-style-type: none"> SATA with or without Native Command Queuing
Advanced Data Features	<ul style="list-style-type: none"> Bootable with Mac OS X 10.6.x or later Ultra High Performance SATA 6G design Fully compliant with SATA Revision 3.0 specification Bus Mastering off-loads data I/O handling from CPU CRC error checking, for all bits transmitted (command, data, and status), offers enhanced data protection for high-speed Serial ATA drives Two independent data channels allows for separate device timings Automatically identifies and configures drive types
Onboard Flash ROM	<ul style="list-style-type: none"> Allows easy upgrades to the latest firmware
Warranty	<ul style="list-style-type: none"> One year limited parts & labor
Physical Dimensions	<ul style="list-style-type: none"> 160mm(L) x 7mm(W) x 110mm(H) (not including bracket or internal 2.5" SSD/HDD)
Power Requirements	<ul style="list-style-type: none"> 5V ± 5%
Environmental	<ul style="list-style-type: none"> Temperature: <ul style="list-style-type: none"> Operating: +5°C to +55°C Non-Operating: -25°C to +70°C Relative humidity: <ul style="list-style-type: none"> Operating: 20% to 80% Non-Operating: 15% to 90%
EMC Compliance	<ul style="list-style-type: none"> EN55022/1998, EN55024/1998 (European Community) FCC Part 15 Class B (US)

System Requirements

Operating System

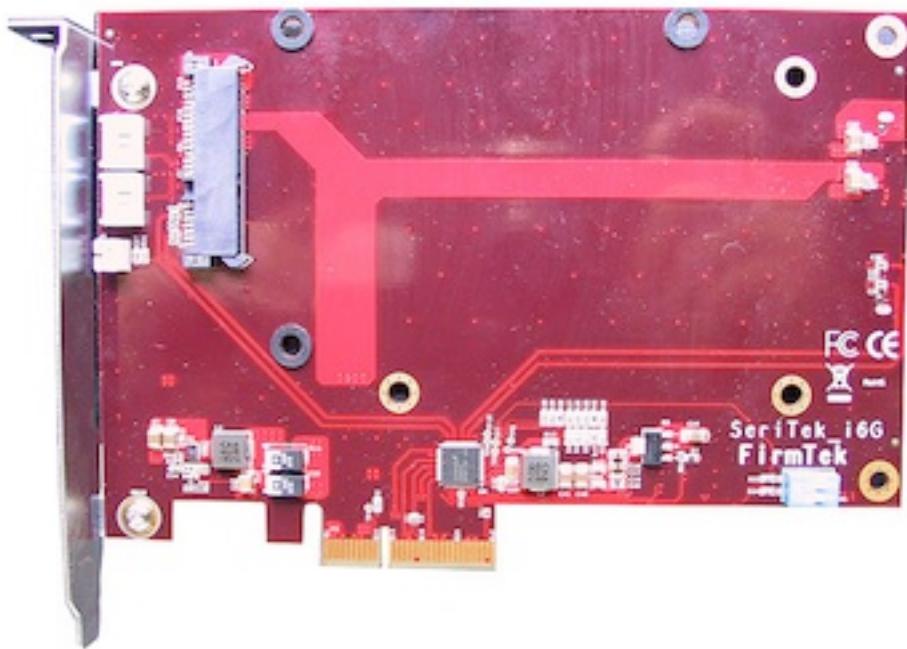
- Macintosh OS X version 10.6.x or later
- Windows 7 or 8, 32 or 64-bit

Hardware Requirements

- PCI-Express based Macintosh with available PCI-Express 4x expansion slot or a Thunderbolt PCIe Expansion Chassis
- Internal 2.5" SSD/HDD

Materials Required

- Standard medium-sized Phillips screwdriver may be required if computer does not have a PCI bracket with captive screws



SSD not included with SeriTek/i6G

Installing the SeriTek/i6G



Caution:

Prior to installing the SeriTek/i6G host adapter and hard drive(s) or peripheral(s), please make sure your data is backed up.

The SeriTek/i6G host adapter and your Macintosh contain sensitive components that can be permanently damaged by Static Electric Discharge. Be sure you're working in an area free of static electricity to prevent them from being damaged. Use a wrist grounding strap if you have one or regularly touch a metal part of the computer chassis such as the power supply case or a port access cover to discharge any built-up static electricity from your body. Make sure to handle the SeriTek/i6G host adapter by its bracket or around its edges to avoid damage to the card by static electricity.

Introduction

This section describes the proper method of installing the SeriTek/i6G.

Internal 2.5" SSD/HDD Installation:

Up to two 2.5" SATA SSD or HDD drives can be attached to the SeriTek/i6G card. To mount drives on the SeriTek/i6G, please do the following:

1. Place a rubber spacer on top of each gold plated screw hole between the card and drive.
2. Slide the 2.5" HDD or SSD onto the SATA mounting bracket.
3. Secure each drive using three mounting screws per drive.

SeriTek PCI-Express Host Adapter Installation:

1. Properly shut down your computer and disconnect the AC power cord.
2. Open the side panel. On some models, the user may need to unscrew the captive screws in the PCI bracket to access the PCI-Express slots. Please refer to your computer user manual for more information about gaining access to PCI-Express slots.
3. Choose an empty 4x or higher PCI-Express slot for installing the SeriTek/i6G.
4. Remove the PCI slot screw or the PCI Bracket.
5. Remove the SeriTek/i6G from its protective packaging. Make sure to hold the card by its bracket or around its edges to avoid touching components on the board that might be damaged by static electricity.
6. Position the PCI-Express card bracket by facing it towards the rear of the computer. Align the gold connectors of the SeriTek/i6G over the PCI-Express slot and gently press it into the PCI-Express slot until the card is firmly seated. If the card is properly seated, the upper ear of the PCI-Express card bracket should line up with the top of the PCI bracket mounting location.
7. Secure the card with the PCI screw or the PCI bracket (See Figure 1). Close your Macintosh computer case and re-attach the AC power cord.

Thunderbolt PCI-Express Expansion Chassis Installation

If you will be installing the SeriTek/i6G in a Thunderbolt Expansion Chassis please follow the installation instructions provided with the Chassis. If you will install the SeriTek/i6G in the ThunderTek/PX please see the Troubleshooting section of this manual on page 19.



Figure 1: Inserting and securing the SeriTek/i6G in a Computer

The SeriTek/i6G host adapter is now installed. Once the FirmTek driver is installed and the computer is restarted, the SeriTek/i6G will be recognized by Mac OS X.

Formatting Serial ATA Drives Using Macintosh OS X Version 10.6.x or Later

Turn on your Macintosh computer.

1. Open Apple's *Disk Utility* which is located in the Utilities folder of the Macintosh OS X start-up volume.

To open Disk Utility:

- a) From the Finder, click on the Go menu
- b) Pull down to Utilities and release the mouse button
- c) Double click the Disk Utility Application (See Figure 5)



Figure 5: Locating Apple's *Disk Utility*

- Review the list of hard disks shown in *Disk Utility* (see Figure 6). Drives that have been formatted should have a volume name below their listing. New, unformatted disks typically have no volume name. Carefully select the hard disk you wish to format.

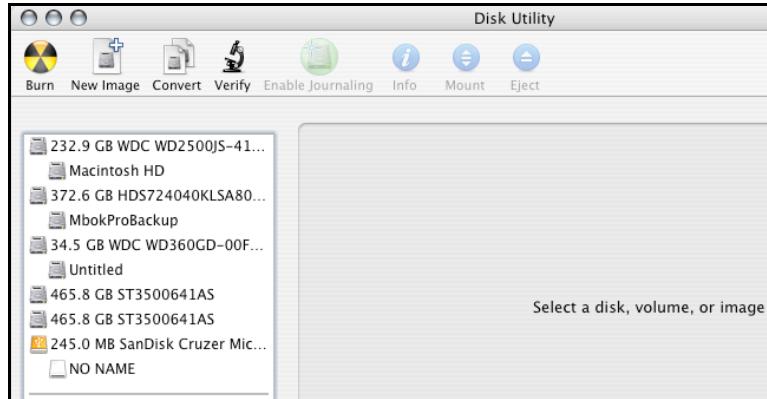


Figure 6: Example hard drive listing

- After carefully selecting the drive you wish to format, select the *Erase* tab in Apple's *Disk Utility* (see Figure 7).

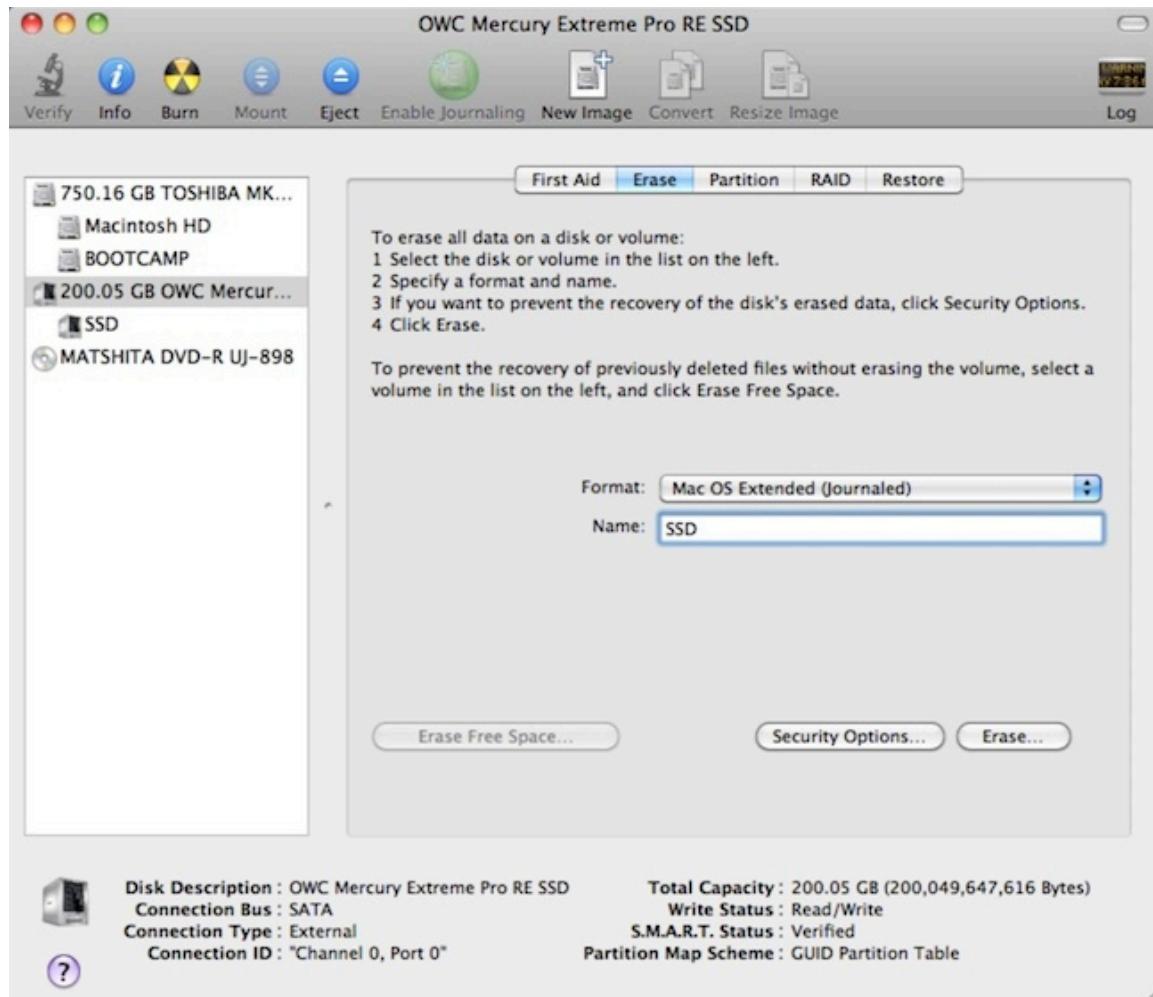


Figure 7: Selecting the *Erase* tab in Apple's *Disk Utility*

4. For *Volume Format*, the default choice is “Mac OS Extended (Journaled).”
5. In the *Name* field, users can type a name for the new hard disk.
6. If the selected SATA hard disk or Solid State Drive (SSD) has data on it, be sure to back up any important data before clicking the *Erase* button. Once the Erase button is pushed the selected device will be formatted for use with Mac OS X. Any previous data on the disk will no longer be available.
7. Click the *Erase* button to format the hard drive.
8. Once the hard drive is initialized, it will be displayed as an icon on the Mac OS X desktop.

Creating a RAID Volume

(Macintosh OS X version 10.6.x or Later)

Mac OS X 10.6.x or later Disk Utility RAID (Redundant Array of Independent Drives) options allow the user to display multiple disks as a single volume. A RAID 1 mirror can provide data redundancy in the case of a hard disk hardware failure. A RAID 0 striped RAID set, can increase performance and volume size by striping multiple disks into a single. Both methods are described below.

Mirrored RAID Set - Apple Disk Utility can be used to create a mirror. This is also known as a RAID 1 configuration. The hard disks should be the same size and model for optimal performance. Data written to a mirror volume is archived onto two separate duplicate hard disks. The mirror configuration provides redundancy that will usually protect data should a single hard disk fail. A mirror cannot protect against the user accidentally trashing an important file. In addition, if the mirror hard disk directory becomes corrupted, the corruption will be copied to all hard disks in the mirror configuration. As a result, a backup copy should always be maintained of any important data on the mirror. RAID 1 mirror performance equals the performance of the slowest hard disk in the mirror set. The RAID 1 mirror volume size equals the size of the smallest member disk. All data on hard disks used to create a new Disk Utility based mirror will be destroyed when the mirror is created.

Striped RAID Set - Apple Disk Utility can also be used to create a striped RAID set. This is also known as a RAID 0 configuration. The hard disks should be the same size and model for optimal performance. Data is spread (striped) equally across multiple hard disks for increased performance. A striped RAID set provides no data redundancy. As a result, should one hard disk fail all data stored on the RAID 0 volume is lost. While a striped RAID set provides excellent performance, a back up is required to protect important data. RAID 0 direct connect performance usually equals the performance of the slowest hard disk in the RAID 0 x the number of hard disks used. The RAID 0 volume size equals the size of the smallest member disk x the number of disks in the RAID 0. All data on all hard disks used to create a striped RAID set will be destroyed when the RAID 0 is created with Disk Utility.

Step by step instructions

1. Turn on your computer.
2. Open Apple *Disk Utility*, which is located in the Utilities folder of the Mac OS X start-up volume.

To open Disk Utility please do the following:
a) From the Finder, click on the Go menu
b) Pull down to Utilities and release the mouse button
c) Double click the Disk Utility Application
3. Review the list of hard disks show within *Disk Utility*. Hard disks that have been formatted should have a volume name below their listing. New, unformatted disks typically have no volume name. Carefully select the hard disk you wish to format.
4. Select the *RAID* tab in Apple's *Disk Utility* (see Figure 8)

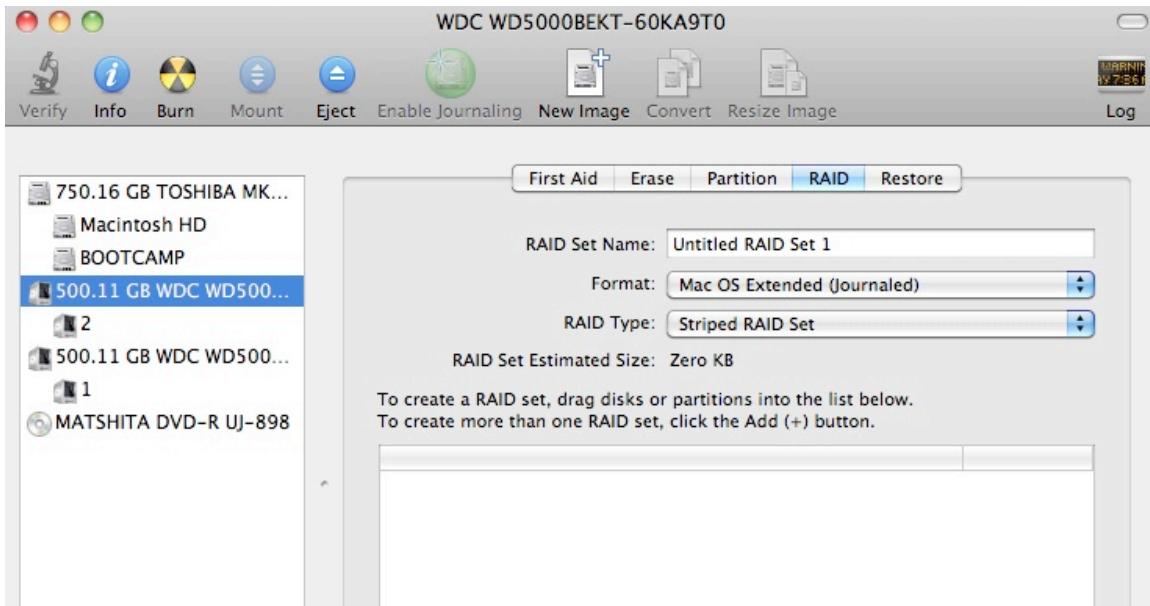


Figure 8: Selecting the RAID tab in Apple's *Disk Utility*

5. Carefully select and drag a hard drive to add it as a member of the new RAID volume in the *Disk Utility* status window (Figure 9).

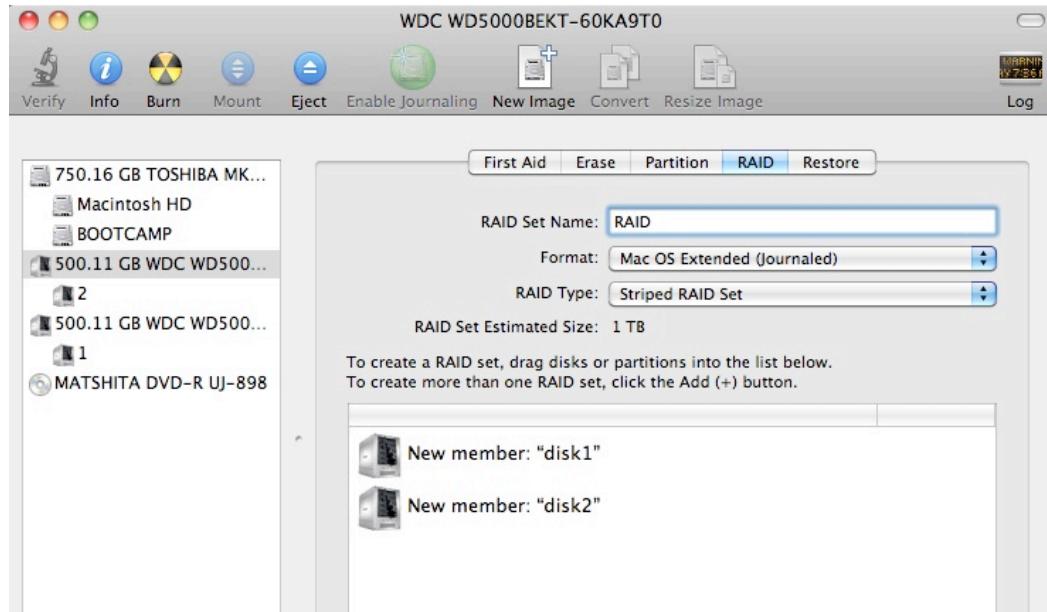


Figure 9: Example drives and options for a RAID volume;
Drag and Drop Drives into the RAID Set Window

6. Repeat step 5 for each member for the RAID volume.
7. Choose a *RAID Scheme*: Stripe or Mirror.
8. Name the new RAID volume.
9. For *Volume Format*, the default choice is "Mac OS Extended (Journaled)". Note: Mac OS X 10.6.x users and later can select the RAID block size. For enhanced performance with large file sizes push the option button and select a RAID block size of 64K or 128K.

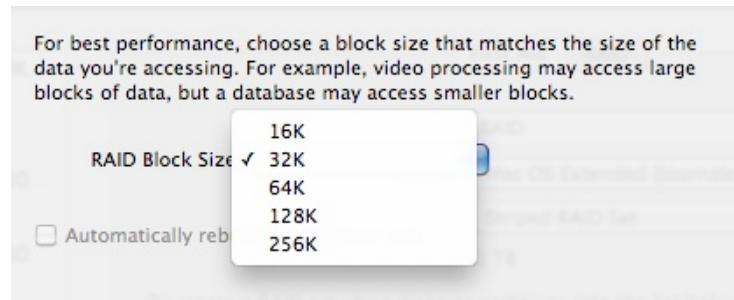


Figure 10: Selecting a RAID Block Size

10. After reviewing the options selected, click on the *Create* button to initialize the new RAID volume (see Figure 11).

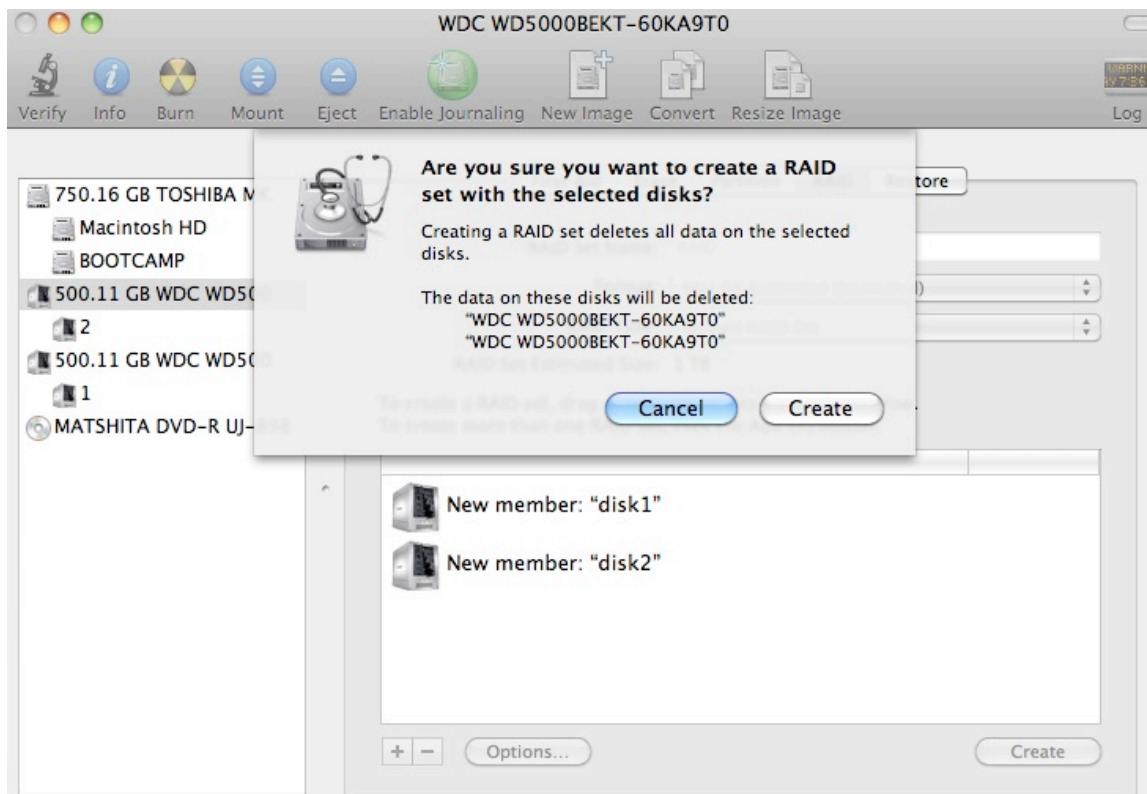
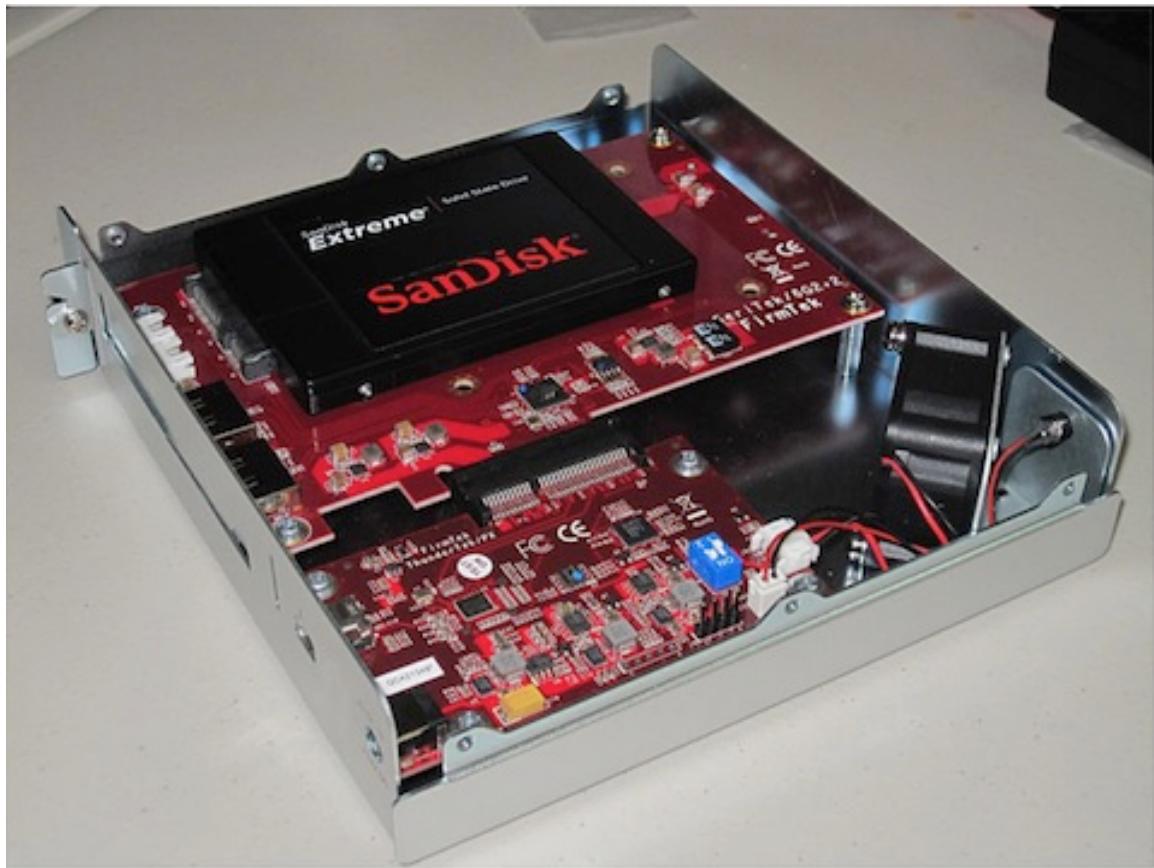


Figure 11: Creating a new RAID volume

11. After the RAID volume is successfully initialized, it should appear on the desktop.



SeriTek Card Mounted Inside ThunderTek/PX

III. Troubleshooting

- **Installing SeriTek/i6G in ThunderTek/PX**

The SeriTek/i6G can be installed in the ThunderTek/PX by following the instructions found on page 9-11 of the PX manual. Support posts are not required or included for ThunderTek/PX-i6G.

- **The SeriTek/i6G host adapter is not recognized**

Check the SeriTek/i6G adapter by ensuring it is properly seated in the PCI-Express slot on the motherboard. Verify the correct driver is installed and the OS is supported.

- **My hard disk won't mount**

Check connections. Ensure the card is properly seated and the drive(s) are properly mounted on the card.

Apple System Profiler

1. Open *Apple System Profiler* by clicking “About this Mac”, in the *Finder while holding the option key*, click on “System Information”. *Apple System Profiler* will now open. Select *PCI Cards*. Under *PCI Cards* section, *pci1b21,625* should be shown. This is the SeriTek/i6G card.
2. If *pci1b21,625* is not listed, re-seat the card in the PCI-Express slot by removing and reinserting it and then restart the Mac Pro.

- **Transfer rate seems less than SATA 6G specified max. of 600 Mbytes/sec.**

The 600 Megabyte/Sec speed is the theoretical limit. It is usually higher than the speed provided by a single SATA or SSD hard disk. A high performance 6G SSD will more accurately display the available bandwidth provided by the SeriTek/i6G.

- **Does the SeriTek/i6G work with all Mac and PC computers?**

No, SeriTek/i6G only works with desktop computers with at least one 4x or higher PCI-Express slot available and Mac OS X 10.6 and above or Windows 7 or later. If your system lacks PCI-Express slots, a PCIe expansion chassis can be used with the SeriTek/i6G and Thunderbolt enabled computers.

- **Does the SeriTek/i6G work with Boot Camp?**

Yes, Windows 7/8 are supported with direct connect enclosures like the miniSwap/ES. The SeriTek/i6G provides additional storage for your Boot Camp configuration. Booting Windows 7/8 is unsupported whether the card is used in a PCIe slot or with a Thunderbolt Expansion chassis.

- **Mac OS X Boot drive on the SeriTek/i6G will not boot**

The SeriTek/i6G is bootable with Mac OS X 10.6.x or later. The Mac OS X installer can be used to create a boot drive. To create a multi-drive Bootable RAID, please use CarbonCopy Cloner to clone the internal Boot drive to the target boot volume on the SeriTek/i6G. The Apple Recovery Partition is not supported with RAID volumes.

IV. Product Support

Technical Support

For additional information on how to use SeriTek/i6G, download the latest firmware updates, or for technical assistance, please visit us at www.firmtek.com, or email us at support@firmtek.com.

Please provide the following information when contacting us:

- Product model and serial number
- Firmware version (You may use the Apple System Profiler as described in the troubleshooting section to determine the firmware version. Look for ROM # and Revision #)
- Macintosh model
- Macintosh OS type and version (example: Mac OS X, version 10.5.8)
- Hardware and software installed on your system
- Contact information including daytime telephone number and email address
- A detailed description of the question or problem

Return Merchandise Authorization

If FirmTek technical support determines the product needs to be repaired or replaced, a Return Merchandise Authorization (RMA) number and shipping address will be provided. Please pack the SeriTek/i6G in the original shipping container along with all of the original packaging - including the static bag, all hardware, software, cables, and other accessories that came with the original product. You are responsible for shipping and insurance costs, and any damage incurred due to improper packaging or transport.

FirmTek reserves the right to determine whether the product will be repaired or replaced with new or refurbished parts, or with a new or refurbished product. Standard United States return shipping charges will be paid by FirmTek. Foreign and other shipping methods such as express shipping are available for an additional charge.

Write the RMA number on the outside of the shipping container, and include the following information with the shipment:

- A description of the problem
- A copy of the original purchase invoice
- Return shipping address
- Contact information including daytime telephone number and email address

FirmTek, LLC reserves the right to refuse shipments missing a valid RMA number.

V. Product Warranty and Disclaimers

FirmTek warrants to the original buyer only that this product shall be free from defects in material and workmanship for a period of one year from the original date of purchase. This warranty is valid only when the original purchase invoice is provided. This warranty shall not apply to any defects resulting from improper handling, misuse, misapplication, abuse, or unauthorized modification(s) which are performed by end user.

FirmTek, LLC reserves the right to make changes to any products described in this manual at any time without notice. FirmTek, LLC assumes no responsibility for the use or reliability of hardware or software that is not supplied by FirmTek, LLC or its affiliated companies. FirmTek, LLC does not assume any responsibility or liability arising out of the application or use of any product described in this document, except as expressly agreed to in writing by FirmTek, LLC; nor does the purchase or use of a product from FirmTek, LLC convey a license under any patent rights, copyrights, trademark rights, or any other intellectual property rights of FirmTek, LLC or third parties.

VI. Regulatory Compliance Statements

Federal Communications Commission Radio Frequency Interference Statement

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.
- Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

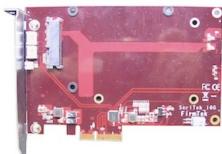
CE European Union Compliance Statement

EMC compliance:

Emissions: EN55022: 1998, Class B
Immunity: EN55024: 1998
EN61000-4-2: 1995+A1: 1998
EN61000-4-3: 1995+A1: 1998
EN61000-4-4: 1995
EN61000-4-6: 1996
EN61000-4-8: 1993

Quick Start - Install Internal Drive on SeriTek/i6G

Package Contents



SeriTek/i6G



6 Circle Spacer



6 Mounting Screws

Install 2.5" SSD/HDD on the SeriTek/i6G

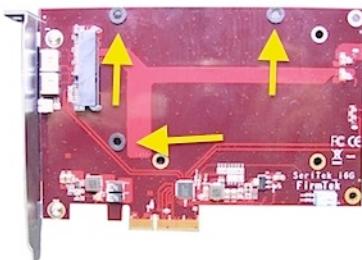


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1. Place 3 Circle Spacers on top the Golden Plated Circle of the SeriTek/i6G adapter as shown.



2. Slide the 2.5" SATA SSD/HDD on top the spacers and connect drive to the SATA/Power connector as shown.
3. Turn the SeriTek/i6G over, and secure the drive mounting screws.
4. Repeat step 1, through 3 for the 2nd drive.

